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(54) Title: ELECTRONIC CONTENT GUIDE RENDERS CONTENT RESOURCES TRANSPARENT

(57) Abstract: A data management system on a home network collects data that is descriptive of content information available at various resources on the network. The data is combined in a single menu to enable the user to select from the content, regardless of the resource.

Electronic content guide renders content resources transparent

## FIELD OF THE INVENTION

The invention relates to a system that enables a consumer to select from among information content available from TV broadcasts and from other resources providing content information.

## BACKGROUND ART

A conventional electronic program guide (EPG) provides the user with an on-screen listing of TV programs scheduled for broadcast on the channels that the user can tune into. Such EPG's for television systems are known in the art, particularly with regard to cable and satellite television systems. See, for example, U.S. patent 5,666,645; U.S. patent 5,751,282; U.S. patent 6,005,631, all incorporated herein by reference. An EPG is provided by a service provider, referred to EPG distributor. For example, the EPG data is converted into a video signal at the head end and transmitted to the user's TV set via, e.g., a dedicated channel, in SI (system information) data, via an OOB (out-of-band) channel or via an Internet connection. In another example, an EPG is made available through a server via a data network. The PTV 100 Personal TV Receiver, a joint effort of Philips Electronics and TiVo, is a hard-disk-drive (HDD) based video recorder for TV programs that requires the use of a phone connection to receive daily programming guide updates from a remote server. Based on the EPG the user can select what to watch and what to record on, e.g., the HDD.

International Application WO 97/34413, herein incorporated by reference, relates to a television system that has a television viewing mode and a guide mode. The guide mode includes an EPG, which provides to the viewer program information for scheduled broadcast programs, and a tape index guide, which provides information for programs recorded on a video cassette. In both guides, real time images of a program are displayed in a picture-in-picture (PIP) window on the television screen and guide information is displayed in the background. In both guides, the viewer may switch between a currently telecast program or a recorded program. The viewer may access either guide from the television mode and vice versa. In the guide mode, the viewer may independently switch the guide information and the type of program, i.e., tuned or recorded, in the PIP window.

By pressing a guide/tv button on the remote controller, the viewer may enter either an EPG or tape index guide from the normal television mode and also return to the television mode from either type of guide. In either the television or guide mode, a program source button toggles the program display between a tuned program and a recorded program playing on the VCR. In the guide mode, a guide/index button toggles between the EPG and the tape index guide. In the television mode, a PIP button allows the viewer to view the program being output from one program source, i.e., the tuner or the VCR, while viewing the program output from the other program source full screen.

## 10 SUMMARY OF THE INVENTION

Known EPG's combine data about scheduled broadcasts. That is, a conventional EPG has a time axis. Also, known EPG's typically have limited organizational views in order to facilitate easy selection by the end-user or easy customizing, if at all. The system discussed in WO 97/34413 combines an EPG with a tape index guide in the sense that the user can toggle between them for on-screen display of either the one or the other.

The inventors have realized that the known guides still focus on the device or apparatus that provides the content information, rather than on the content information itself regardless of its resource and/or regardless of its time of availability, e.g., broadcast. That is, the known guides are device-centric and broadcast-centric rather than content-centric, whereas the user is typically more interested in the "what" of the content information than in the "wherefrom".

The inventors have further observed that recording devices with personalization features in a digital context, such as the Personal TV Receiver mentioned above, are changing the perspective of selecting content information. However, it is no longer relevant to the consumer when what program is being broadcasted by a broadcast station or supplied by another service provider, such as in a video-on-demand service. With such a digital recorder there is always content information available for selection and there is always content information that is available now.

In addition, content information is not limited to video or audio. Content also includes Internet pages, previews, ads, email, etc. Content is also not limited to what is being distributed in a broadcast, but instead can come from any resource, e.g., locally recorded on a previous occasion, interactive Internet sites, a DVD or CD jukebox, etc. Relevant is that the content is immediately available to the consumer, regardless its resource, delivery mechanism or delivery time. Another aspect is that there is a trend in more, and more diverse,

content becoming accessible to the consumer. For example, a consumer can get access to hundred different TV broadcasting channels, especially via the cable. As another example, nearly 10,000 radio stations currently broadcast over the Internet. As a result, more services will emerge to categorize, recommend and/or preview and/or advertize certain programs or channels or web sites. Within this context, reference is made to U.S. serial no. 09/345,339 (attorney PHA 23,700) filed 7/1/99 for Mark Hoffberg et al., for CONTENT-DRIVEN SPEECH- OR AUDIO-BROWSER, herein incorporated by reference. This document relates to categorizing resources on the Internet. The Internet is searched in order to find resources that provide streamable audio such as live Internet broadcasts. The resources are identified based on their file extension and are categorized according to, e.g., the natural language or music style. The user is enabled to browse the collection based on textual or musical input.

An aspect of the invention is the use of the personalization features as provided by, e.g., the Personal TV Receiver and a home network, to allow for a much more customized view on a wider range of content information available to the individual user than was possible heretofore.

Accordingly, the invention provides a data management system that combines the data of an EPG with other data for other types of content information, typically within the context of a home entertainment system. The system comprises a data base for representing schedule information associated with scheduled content information from a content provider such as a broadcasting station or a video-on-demand (VOD) service. In addition, the data base also represents inventory information that is associated with content information available from another resource, e.g., as recorded at the consumer's digital Personal TV Receiver during previous broadcasts, or from a CD or DVD jukebox. Accordingly, the invention introduces a general type of guide, herein after referred to as an electronic content guide (ECG).

In an even more general aspect, the invention provides a data management system for a home network with multiple resources. The system stores respective data descriptive of respective content information available from a respective one of the multiple resources on the network. The system combines the respective data in a single menu so that the user can select from the content information available. The multiple resources comprise, for example, a receiver for receiving first content information from external to the home network and a play-out apparatus for playing out second content information that is locally available in pre-recorded format.

In addition, the menu can also represent content information available at a Web site with a specific URL, or available as email content information, as electronic advertisements, or as video games. By means of presenting the aggregate available content information regardless of its resource, the consumer is provided with a much wider range of options than conventional EPG's can provide, if only for the fact that these do not offer the content information recorded by or local to the individual consumer in a single menu. The term "local" can be interpreted as including recording sites to which a specific individual consumer has access, e.g., as having access to a LAN, an electronic library, or as a favor or owing to social relationships, see, e.g., U.S. serial no. 09/283,545 (attorney docket PHA 23,633) filed 4/1/99 for Eugene Shteyn for TIME- AND LOCATION-DRIVEN PERSONALIZED TV, herein incorporated by reference. This document discusses a server system that enables a subscriber to select a specific broadcast program for recording and a specific location and time frame for play-out of the recorded program.

Preferably, the system enables the consumer to edit the ECG, e.g., by arranging the options, representing the various content information entities, to his/her preferences in an array in a GUI or in any other manner suitable for this purpose. Within this context, reference is made to U.S. serial no. 09/464,855 (attorney docket PHA 23,875) filed 12/16/99 for Willem Bulthuis et al., for HAND-EAR USER INTERFACE FOR HAND-HELD DEVICE, herein incorporated by reference. This patent document relates to a simple user interface (UI) providing auditory feedback of available menu options. More specifically, a hand-held information processing device, such as a mobile phone, has a thumb wheel that lets the user scan a circular array of options. Each respective one of the options is represented by a respective audio output that gets played out when the wheel is turned a notch up or down. This enables the user to select an option with one hand and without having to look at the device. It also allows for a form factor smaller than that of a conventional mobile phones since a keypad is not needed for entering digits to make a call from a personalized directory.

The system in the current invention preferably enables the ECG to represent, possibly upon user customization thereof, the substantive content information by topical category, theme, mood, modality (e.g., "video" or "audio"; "passive" [no interactivity] or "active" (interactivity as in video games or hopping Web sites), temporality (news topics vs. historic issues), entertainment/educational, etc., etc. The representation regarding the substance is preferably customizable or personalizable, either through editing functionalities accessible to the consumer or as delegated to a dedicated service in dependence on stated

user preferences. As to the latter, reference is made to U.S. serial no. 09/519,546 (attorney docket PH-US 000014) filed 3/6/00 for Erik Ekkel et al., for PERSONALIZING CE EQUIPMENT CONFIGURATION AT SERVER VIA WEB-ENABLED DEVICE, herein incorporated by reference.

5 Preferably, the system also enables the consumer to customize a graphical or auditory representation of the ECG as presented to the consumer via a UI on the consumer's home network.

#### BRIEF DESCRIPTION OF THE DRAWING

10 The invention is explained in further detail below, by way of example, and with reference to the accompanying drawing wherein:

Fig.1 is a block diagram of a system in the invention;

Figs.2, 3 and 4 are block diagrams illustrating aspects of an ECG.

15 Throughout the drawing, same reference numerals indicate similar or corresponding features.

## PREFERRED EMBODIMENTS

As discussed above, an aspect in an embodiment of the invention relates to providing a way to combine within an ECG a conventional EPG, which relates to scheduled content information, and non-scheduled content information (e.g., recorded locally or available at practically any instant desired). This is explained below.

Fig. 1 is a diagram of a home entertainment system 100 in the invention.

System 100 comprises in this example an information processing sub-system 102, a cable connection 104, a telephone line 106, a satellite connection 108, a CD jukebox 110, a DVD jukebox 112, a recording device 114, a display monitor 116 and loudspeakers 118.

Recording device 114 may include, e.g., a VCR, or a device based on CD-R, DVD-R, DVD-RW, memory stick, or HDD. Jukeboxes 110 and 112 may have a recording functionality as well. Cable 104 enables sub-system 102 to receive content information from a content provider and to return data, for example, to allow for interactive content delivery, e.g., interactive TV programs or VOD, or interactive data delivery. Telephone line 106 comprises in this example an ADSL (Asymmetric Digital Subscriber Line) connection for receiving content information and allowing bi-directional communication. ADSL is a technology for transmitting digital data at high bandwidths on existing telephone phone lines. Satellite connection 108 enables sub-system 102 to receive content information via satellite. Bi-directional communication via satellite is going to be available within the CE domain.

System 100 may have all three interconnections 104, 106 and 108 dependent on, e.g., what delivery mechanism is needed with which service provider or content distributor. Display monitor 116 and loudspeakers 118 are play-out devices for the content information received via connections 104, 106 and 108, and for content information available from jukeboxes 110 and 112, as well as from recorder 114. Recorder 114 can be a component, e.g., a HDD-based device, connected to sub-system 102 or forming a functional part of sub-system 102. Similarly, one or both of jukeboxes 110 and 112 can be functional component of sub-system 102.

Subsystem 102 serves as a gateway for routing content information to or from the various resources 104-118. The functionalities relating to the communication via cable 104, telephone 106 or satellite 108 are individually known from the set-top boxes. Typically, such set-top box functionality includes a browser 120 and an email program 122 that enable user-interactivity, over cable 104 or telephone line 106, with a remote server (not shown) via suitable user-controls 124 and display monitor 116 for visual feedback. Typically, a set-top box or a HDD-based Personal TV Receiver (PTV) such as the Tivo box enable a user to

receive data for an EPG for an overview of scheduled programs. The programs are supplied via a channel on cable 104 or satellite 108. The EPG data is supplied via, e.g., telephone 106 or in VBI, or an out-of-band (OOB) channel on cable 104, or a cable modem (not shown), or as satellite in-band information, and control the display of the EPG and the user-interaction therewith.

Resources 104, 106 and 108 provide TV programs or Video-on-Demand programs, i.e., content information whose supply has been scheduled and whose supply is not controlled by the user of system 100. Resources 110, 112, 114, 120 and 122 on system 100 give access to content information regardless of the moment in time and under full user control. The invention now supports combining the EPG, i.e., data descriptive of the scheduled content available from resources 104 and 108, with the data descriptive of the non-scheduled content available from resources 110, 112, 114, 120 and 122 and for the reasons already mentioned above. The data descriptive of the scheduled content and that of the non-scheduled content are combined in a data base 126. Data base 126 and cross sections thereof can be graphically or auditorily be represented as an electronic content guide (ECG), for example as a GUI on monitor 116 or as a listing of items in pre-recorded or synthesized voice via loudspeakers 118. In the latter case a text-to-speech converter is required if the descriptive data is available in, or convertible into, a text format. Text-to-speech converters are known in the art and are not further discussed herein. The ECG gives the user an overview of content information that is available "now" and facilitates selecting content from the resources available. The ECG is preferably interactive in the sense that graphically or otherwise, e.g., via the user's voice input, selecting an item of the ECG starts retrieving the item's content information for play-out or recording, similarly to current interactive EPG's. The combination of the descriptive data for all resources is discussed in further detail below.

DVD's and CD's have identification data that enable identifying the pre-recorded content, either directly, e.g., through a text file on the disk, or indirectly, e.g., via a dedicated server on the Internet. Jukeboxes 110 and 112 have access to this data and supply this data to sub-system 102. Sub-system 102 interprets this data as relating to CD's or DVD's as the case might be. This interpretation is feasible, e.g., because the identification data itself comprises this information, or because the ports of sub-system 102 that connect to jukeboxes 110 and 112 enable identification of the data sources when system 100 is being configured, for example by explicit assignment or through their port addresses. As a result, sub-system 102 is capable of identifying the content information available from jukeboxes 110 and 112.

This identification data is stored, possibly after reformatting, in data base 126. As to jukeboxes, reference is made to U.S. serial no. 09/326,506 (attorney docket PHA 23,417) filed 6/4/99 for Pieter van der Meulen for VIRTUAL JUKEBOX, herein incorporated by reference.

5           Scheduling information received from a service provider or distributor via cable, telephone, terrestrial or satellite is formatted, for example, as a conventional EPG for the TV programs and VOD services. This scheduling information is stored, possibly after reformatting, in data base 126. Preferably, when service provider updates the conventional EPG after at least a portion of it has become obsolete, data base 126 is refreshed as well as  
10       far as this conventional EPG is concerned. This technology is known in the art and is not further explained herein.

          Browser 120 enables the user to surf the Web and to bookmark and archive sites of interest in a bookmark log or to keep a user-history of sites visited as in, e.g., Netscape Communicator. The archiving is done, e.g., on recording device 114 or on another  
15       storage component. Bookmarking, managing bookmark logs and archiving contents of Web sites of interest to the user could also be delegated to a dedicated server (not shown) on the Internet. See, for example, U.S. serial no. 09/345,339 (attorney PHA 23,700) mentioned above. URL's and titles of web pages thus are available to sub-system 102 for being stored in data base 126.

20           Sub-system 102 further has email capability 122. Conventional email programs allow the user to categorize, filter and archive messages in files and folders according to date received, name of sender, name of subject, etc. This bibliographic email information thus is available as text files and is stored in data base 126, possibly after reformatting.

25           Sub-system 102 may further comprise, or be connected to, a PC (not shown). The PC can have additional browser and email capabilities and a storage of video game capabilities, etc. Descriptive data thereof are transferred to data base 126, possibly after reformatting.

          Accordingly, data base 126 comprises an inventory of data descriptive of  
30       content information available to the individual consumer and from resources that include remote servers and broadcasting stations, as well as local means such as CD and DVD jukeboxes, email logs and PTV recordings and other resources. In other words, data base 126 comprises data descriptive of content information available from remote suppliers, and available from a distributed home network of the user him/herself.

The descriptive data in data base 126 can be categorized and presented graphically according to the preferences of the user, examples of which have been given above, for facilitating selecting from among the items available. The content information items can be presented graphically on monitor 116 as in a conventional EPG, i.e., a two-dimensional array, or in an alternative manner. For example, the data base can be represented as a decision tree, or a check box, wherein the user selects his/her mood, time of the day, topical issues, interests, keywords, etc., via user controls 124. For example, the user indicates an interest in ice-hockey news, score statistics, players and the actual games. Thereupon, sub-system 102 generates an ECG that is optimized regarding the user's input. Note that the selection is not "device-centric" anymore but "content-centric": it does not matter anymore what device or resource provides what content. Instead, it is the content and the appeal it has to the user that guide the user to a selection.

As to the re-formatting for data base 126, in general different file formats are being used for the data descriptive of the content information from the various resources: the descriptive data from jukeboxes 110 and 112, email program 122, the conventional EPG provided by the service provider, the inventory of bookmarked web sites in topical files in browser 120, etc., all may have a different data format. Preferably, the file formats are converted into a useful intermediate format that allows the data to be easily manipulated by sub-system 102. This can typically be the so-called comma-separated-variable (CSV) format, which is often used to pass data between databases that do not use a common file format. For example, each of resources 110, 112, 120, 122, and the EPG from the service provider has a local data base with an inventory of data that is descriptive of content information associated with each of these resources. Sub-system 102 is enabled to query these data bases and to copy the descriptive data into its own data base 126. It is known in advance that resource 110 provides audio content information, that resource 112 mainly provides video content information, that resource 122 typically provides text-based content information (to which multimedia files may be attached), that resources 104 and 108 typically provide video content information, etc. Accordingly, identifiers of the resources themselves assist in discriminating between the type of multimedia content: audio, video, text, graphics.

Fig.2 gives a functional block diagram of a portion 200 of system 100 that illustrates an example of creating and using data base 126. Portion 200 comprises inventory information for multiple resources in system 200. Portion 200 has a conventional EPG 202, supplied by a service provider, with scheduled TV broadcasts. Portion 200 further has an inventory of MP3 files 204, e.g., on the PC or on another device (not shown) dedicated to

MP3 and capable of being queried by sub-system 102. Portion 200 also has an inventory of CD's 206 and DVD's 208 associated with jukeboxes 110 and 112, respectively. Portion 200 also has an inventory 210 of what has been recorded on recorder 114, e.g., a HDD-based PTV or a DVD-RW. Inventories 202-210 can, but need not, be accommodated on the resources to which they pertain. In a distributed network it is not relevant where these inventories reside physically. For example, an identifier of a CD or DVD can be sent to a look-up service at a dedicated server on the Internet, upon starting to play out the CD or DVD, upon storing it in jukebox 110 or 112, or upon another action by the end-user. The server then finds a matching description of the content information and downloads it to the jukebox or to sub-system 102 for further usage in data base 126.

Each of inventories 202-210 may have its own proprietary format. If the CSV format, mentioned above, is not a viable solution to combine the data into a shared data base 124 dedicated translation/interpretation software modules 212, 214, 216, 218 and 220 can be used for conversion into, e.g., the XML format. The XML format has the advantage that it allows easy translation into HTML via XSL. This makes possible, for example, that the data base or a portion thereof is propagated to a handheld remote 222 that has a touch screen 224. Selecting and navigating in a menu of items graphically displayed on the GUI can be done in a manner similarly to browsing and clicking among the hyperlinks on a web page. Modules 212-220 can be made available through a service such as SmartConnect (TM), see, e.g., U.S. serial no. 09/160,490 (attorney docket PHA 23,500) filed 9/25/98 for Adrian Turner et al., for CUSTOMIZED UPGRADING OF INTERNET-ENABLED DEVICES BASED ON USER-PROFILE, herein incorporated by reference. This document discusses a server system that maintains a user profile of a particular end-user of consumer electronics network-enabled equipment and a data base of new technical features for this type of equipment. If there is a match between the user-profile and a new technical feature, and the user indicates to receive information about updates or sales offers, the user gets notified via the network of the option to obtain the feature.

Within the context of the current invention, reference is also made to U.S. serial no. 09/374,694 (attorney docket PHA 23,737) filed 8/16/1999 for Chanda Dharap for SEMANTIC CACHING, herein incorporated by reference. This document relates to the caching of electronic content information based on its semantic type. The cache management strategy is customized for each semantic type, using different caching policies for different semantic types. Semantic types that can be expected to contain dynamic information, such as news and weather, employ an active caching policy wherein the content information in the

cache memory is chosen for replacement based on the duration of time that the information has been in cache memory. Conversely, semantic types that can be expected to contain static content information, such as encyclopedic information, employ a more conservative caching strategy, such as LRU (Last Recently Used) and LFU (Least Frequently Used) that is substantially independent of the time duration that the information remains in cache memory. Additionally, some semantic types, such as communicated e-mail messages, newsgroup messages, and so on, may employ a caching policy that is a combination of multiple strategies, wherein the content information progresses from an active cache with a dynamic caching policy to a more static caches with increasing less dynamic caching policies. The relationship between semantic content type and caching policy to be associated with the type can be determined in advance, or may be determined directly by the user, or could be based, at least partly, on user-history and profiling of user-interaction with the content information. Accordingly, data base 126 for the ECG of the current invention can adopt a caching policy with respect to what descriptive data to store temporarily based on the semantics of the topical content information, e.g., locally recorded (e.g., emails, recorded TV programs) under circumstances depending on the local storage or repository equipment and caching preferences.

Fig.3 illustrates an example 300 of data base 126. Example 300 identifies multiple dimensions, i.e., multiple independent qualities, according to which content information can be selected. One of the dimensions shown is "type" 302 of content, e.g., "audio", "video", "text" (electronic text files), "still picture" (e.g., digital photo album), "books", etc. Another dimension is "URL" 304, which identifies the resource that provides content. Note that the example here has included the "library", which can be, e.g., one's local district's library where one can reserve or check the availability of certain books, DVD's or tapes on-line, or one's own collection of books, etc. For example, the user enables to download the descriptive data into his/her PC by scanning in the book's or DVD's bar code whereupon a look-up service on the Internet downloads this meta data. Other dimensions are "mood" 306, which relates to what the user specifies he/she feels like, and "duration" 308 that indicates a relevant time slot, e.g., a length of the video content on a DVD or the length of a TV program recorded on PTV 114. Yet another dimension is "access privilege" 310 that discriminates between personal content information, e.g., personal email, personal text files on the PC, or movies rated "R", and content for the whole family. Yet another dimension specifies possible contexts 312: business-related content information, entertainment content, educational issues, sports, etc. These dimensions enable the user to make arbitrary cross

sections through the content information based on qualitative or substantive issues, rather than based on device or resource.

Fig.4 shows an example 400 of a selected cross section through data base 126 after the user has specified, through GUI 224, that he/she wants to have access to "video" within an educational context and relating to "documentaries", a sub-category under "educational". The attributes specify current availability of, among other things, an episode of "National Geographics" entitled "Volcanoes", and a documentary "The seven seas" about Dutch naval history. Whether this content information is available in a current TV broadcast, or has been recorded during an earlier broadcast, or is available on a DVD or streamed over the Internet in a Video-on-Demand service is, in first instance, not relevant to the user. Selecting the desired content, e.g., by clicking on the relevant item displayed on GUI 224 activates a macro for setting up system 100 for the purpose of letting the user watch the selected content information. The user may want to know whether or not the content information has been pre-recorded, so that he/she can decide whether or not to record it while currently watching it. GUI 224 therefore preferably notifies the user of the status whether the content is volatile (e.g., currently being broadcast on the public network) or static (e.g., available in pre-recorded format on home network 100 or from a service on the Internet or another data network).

The creation of an ECG can be fully automated once the descriptive data can be extracted in electronic format from or associated with the various content information items. For example, descriptive data of TV broadcasts is available from the conventional EPG, descriptive data for content on CD's and DVD's is available as stored on the disks themselves or indirectly via a look-up service on the Internet. Further examples have been given above. The EPC is preferably user-editable so as to allow for making personal annotations and specifying one or more dimensions according to which to organize data base 126 or its graphic representation on GUI 224.

Preferably, system 100 further allows the consumer to install preference scenarios, or filters. For example, upon selecting "sports" under context 312, system 100 automatically looks for and tunes in, or prepares to tune in on a broadcast of an ice hockey match of the consumer's preferred team. This approach comes in handy when the user knows that around this time the match is being broadcast or is about to be broadcast. The user has programmed sub-system 102, e.g., via a dedicated application, to execute a macro based on user-input: <ice-hockey>, <TV>, <San Jose Sharks> upon merely selecting <sports> at GUI 224. Also, the consumer preferably is allowed to automatically filter certain content

information. For example, the consumer is allowed to record on PTV 114 all documentaries that are broadcast regarding one or more specific topics, e.g., "naval history", and "cosmology", and store them, e.g., on a HDD array (not shown). These linguistic terms or their equivalents occur in the descriptive data of conventional the EPG and trigger the setting up of system 100 for recording.

Preferably, the consumer is allowed to customize the graphical representation of the ECG. For example, the ECG can be made to appear as a semi-transparent overlay when watching TV, or the colors of the text or graphical items in the ECG, its background ("wall-paper"), or arrangement of the selectable items can be customizable under software control.

Preferably, the ECG's graphical representation on a display facilitates user-navigation among the menu options representing the various content information items available. For example, the ECG is represented as a hierarchical menu, wherein the items are categorized and clustered under icons at a higher level. Selection of a category or cluster at a higher level causes a next lower level to appear, e.g., as a drop down menu known from Windows operating systems, or as a next panel in a multi-layered panel organization as known from the PRONTO (TM) universal programmable remote control device made by Philips Electronics. Preferably, the assigning of the items to clusters and/or categories is user-programmable or at least user controllable, possibly via delegating to an application server.

Within this context, reference is made to, e.g., U.S. serial no. 09/271,200 (attorney docket PHA 23,607) filed 3/17/99 for Jan van Ee for FULLY FUNCTIONAL REMOTE CONTROL EDITOR AND EMULATOR. This document relates to a universal programmable remote control device with programmability functions that enable the end-user to customize the device through editing or programming the device's control functionalities.

The programming can be achieved via a PC. The control configuration created via an editor on the PC can be downloaded into the device. The PC has emulator software to test the configuration before downloading. The emulator software and the remote's control software are made identical as a consequence of a software layer that abstracts from the remote's hardware. The emulator for the end-user is thus obtained as an almost free byproduct of the software development phase at the manufacturer.

## CLAIMS:

1. A data management system (100) for a home network with multiple resources (110, 112, 114, 116, 118) , wherein:

- the system stores respective data descriptive of respective content information available from a respective one of the multiple resources; and
- 5 - the system combines the respective data in a single menu (300) for enabling a user to select from the content information available.

2. The system of claim 1 wherein first of the respective content information comprises scheduled content (300 EPG) , and second of the respective content information  
10 comprises non-scheduled content (300, e.g., CD or DVD, or PC).

3. The system of claim 1, wherein the multiple resources comprise a receiver (104) for receiving first content information from external to the home network and a play-out apparatus (114) for playing out second content information that is pre-recorded.

4. The system of claim 1, enabling the user to customize a representation of the menu at a UI.

5. The system of claim 1, enabling the user to edit the respective data.

6. The system of claim 1, enabling the user to specify at least one dimension of the menu.

7. Software for a data management system (100) on a home network with multiple resources, (110, 112, 114, 116, 118) wherein:

- the software enables the system to store respective data descriptive of respective content information available from a respective one of the multiple resources; and
- 25 - the software enables the system to combine the respective data in a single menu (300) for enabling a user to select from the content information available.

8. The software of claim 7, enabling the user to customize a representation of the menu at a UI.

5 9. The software of claim 7, enabling the user to edit the respective data.

10. The software of claim 7, enabling the user to specify at least one dimension of the menu.

10 11. A method of enabling to manage data on a home network (100) with multiple resources (110, 112, 114, 116, 118), wherein comprises:

- storing respective data descriptive of respective content information available from a respective one of the multiple resources; and

15 - combining the respective data in a single menu (300) for enabling a user to select from the content information available.

12. The method of claim 11, comprising enabling the user to customize the menu.

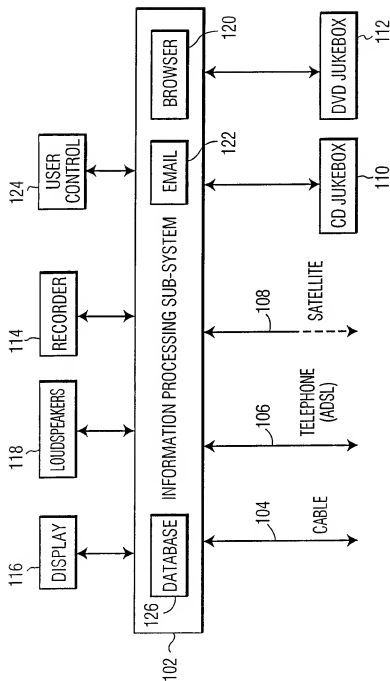
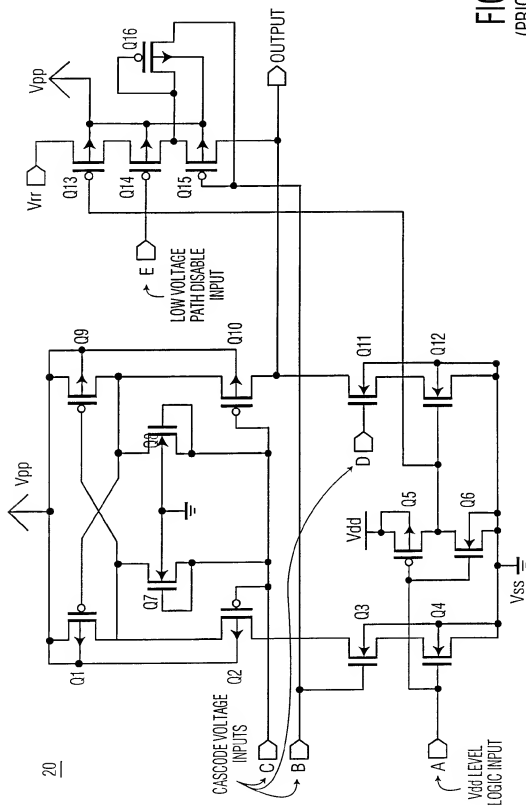


FIG. 1

2/4



**FIG. 2**  
(PRIOR ART)

3/4

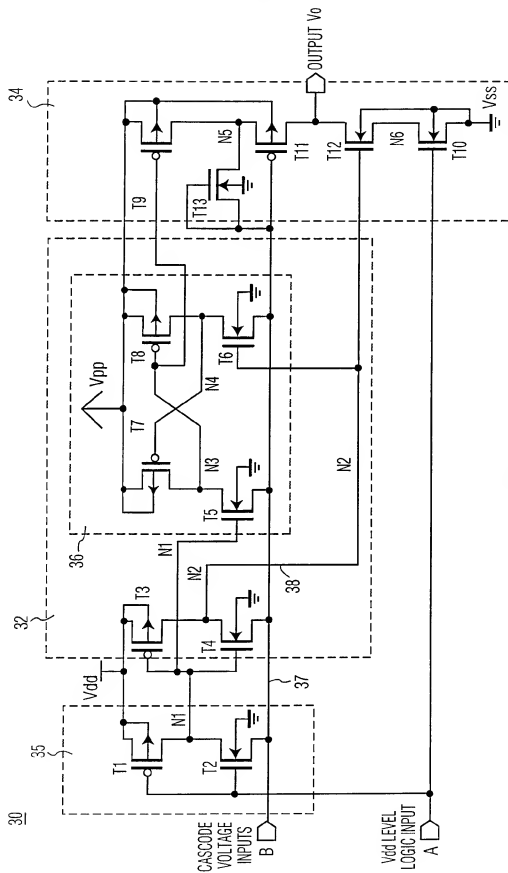


FIG. 3

4/4

